





Occupational Jet Fuel Exposure and Invasive Cancer Occurrence

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Sustaining Readiness through Healthy Communities



Background



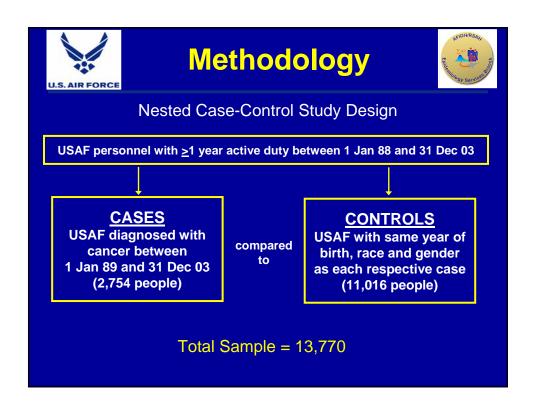
- JP-8 is the primary aircraft, vehicle and equipment fuel used in the USAF
- Jet fuel is the greatest source of chemical exposure for these personnel
- Among fuel-exposed workers
 - Acute adverse health effects have been well-documented
 - Long-term effects have not been widely studied



Purpose



- To conduct an exploratory study measuring the association between occupational jet fuel exposure and invasive cancer occurrence in USAF personnel
- USAF is an ideal population for data records analysis because of the detailed information that is routinely collected
 - Automated Central Tumor Registry (ACTUR)
 - Air Force Personnel Center





Exposure Assessment



- Categorized based on current and previous USAF occupations:
 - High (N=45)
 - Aircraft fuel systems workers
 - Direct and frequent fuel contact
 - Moderate (N=428)
 - Fuel storage and distribution systems
 - Indirect and/or intermittent fuel contact
 - Low (N=13,297)
 - All other occupations
 - Little or no fuel contact





Distribution of Select Sample Characteristics					
AGE AT DIAGNOSIS	Range	18 - 61 years			
	Median	37 years			
GENDER	Female	27.1%			
	Male	72.9%			
RACE	White (Hispanic & Non-Hispanic)	84.6%			
	Black	11.4%			
	Other	3.2%			



Distribution of Jet Fuel Exposure Levels				
Level of Occupational	Cases	Controls	Total	
Jet Fuel Exposure	%	%	%	
High	0.3	0.3	0.3	
Moderate	2.7	3.2	3.1	
Low	97.0	96.5	96.6	



Results



Jet Fuel Exposure and Odds Ratio for Cancer				
Level of Occupational Jet Fuel Exposure	Odds Ratio	95% CI	p-value	
High	0.73	0.32-1.64	0.44	
Moderate	0.84	0.65-1.09	0.19	
Low	Reference			
Exposed	0.83	0.65-1.06	0.14	
Unexposed	Reference			



Specific Cancer Types



Cancer Type	Cases N	OR	95% CI
Acute Myeloid Leukemia	26	0.48	0.06-4.01
All Leukemias	71	0.55	0.12-2.52
Urinary Bladder	48	0.70	0.10-5.07
Breast Adenocarcinoma	217	0.49	0.11-2.17
Hodgkin's Lymphoma	135	0.44	0.10-1.91
Lung (Small & Non-Small cell)	42	0.79	0.09-7.28
Multiple Myeloma	17	1.33	0.14-12.82
Non-Hodgkin Lymphoma	145	1.00	0.33-3.03
Renal Clear Cell	49	0.83	0.21-3.32

Frequencies were too small for valid comparisons of ALL, CLL, CML, dermatofibrosarcoma, hepatocellular and nasal cancers



Discussion - Strengths



- All data were abstracted from surveillance databases that utilized standardized reporting procedures
 - Minimizes chance of recall bias
 - All cancer cases analyzed, coded and entered by trained registrars
- Novel study
 - Addresses gap in the literature and may be useful for future work



Discussion - Limitations



- Individual exposure assessment
- Analysis of specific fuels/chemicals
- Adjust for other cancer risk factors
- Healthy worker effect
- Small number of some cancer types



Discussion - Improvements



- Environmental Sampling
- Biological Markers
- Personal Surveys/Questionnaires
- Measure a more prevalent and/or earlier onset outcome



Conclusion



- No association observed between occupational jet fuel exposure and invasive cancer occurrence
 - Similar findings reported in other studies
- No red flags



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Questions?